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The Use of Trees and Shrubs with Leaves of Abnormal Colors.

A BOSTON correspondent writes in a discouraged tone about the planting he observes in the suburbs of that city. It seems to him that popular taste is setting strongly toward Prunus Pissardi, the Golden Elder, variegated Negundos and the like. We have no doubt that too many trees and shrubs which are valued for the abnormal coloring of their leaves are used about Boston, and, in fact, about every other American city. Unless our own observation is at fault, however, the tendency of public taste, as a rule, is in the other direction, by which we mean that the people who plant nowadays are more inclined to follow the teachings of nature in this respect than they were a few years ago, when the tree agent, with his highly colored catalogues, was more pervasive and influential than he now is. The so-called foliage plants with brightly colored leaves and hues, set in patterns of various sorts, are certainly not as prevalent as they once were, and it is very evident that in American parks the use of shrubs and trees with streaked and spotted or vari-colored leaves is not as profuse as it is in European parks. Perhaps, our correspondent in some afternoon drive has observed several glaring offenses against that quietness and self-restraint in planting which alone can make home grounds homelike, and this has depressed his spirits.

First and last, we have often discussed the principles which ought to underlie the art of garden design so far as it relates to the selection of trees and shrubs for some peculiarity of form or of color. It would be an affectation of severe taste to lay down a rigid and invariable rule that no plant should be used whose individuality was so pronounced that it might be called abnormal. In the hands of a skilled artist a plant with yellowish or wine-colored leaves might be used occasionally as a climax in a gradation of color. Nature herself gives a wide range to select from between the sombre tone of the dark green foliage of certain Pines and other conifers to the pallid gray of the Lead-plant, the silvery tints of the Elæagnus and the almost snowy leaves of our native Hydrangea radiata when they are disturbed by the wind so as to show their under side. There is no fear that our natural landscapes shall ever be of that "vapid green" which is depreciated by the rhyming gardener in his well-known lines. But with all her variety nature rarely, in our northern latitude, produces variegated leaves. It is true that in the autumn we have a wealth of color in the foliage of every landscape, and as the leaves come out in spring they take on tints even more delicate and quite as remarkable in their range. But both these displays are transient. Much of their beauty consists in the fact that it is evanescent, just as our most luxuriant displays of blossoms in the flowering time of the Dogwood and Rhododendron and Judas-tree and Crab-apple clothe many a forest border with a beauty which is as profuse as it is fleeting,

These are the two real objections to the free use of plants with vivid foliage. They are unnatural, or, at least, they are alien to our climate, and they are monotonous. Nature occasionally produces a freak, but it is not in accordance with nature to multiply these oddities until they become prominent features in the landscape. A Negundo with pale and sickly foliage may be a chance production of nature, but nature never produced these pallid trees in such comparatively large numbers as they appear in certain European parks. Nor did any one ever see in nature such masses of purple Barberry or Golden Elder as we see in many private grounds in America. When we exalt what is rare and accidental to the place which ought to be occupied by the typical and normal vegetation of our climate, we are forcibly subverting the laws of nature and substituting devices of our own invention. It is not simply because we are introducing high colors into the landscape, for few countries in the world have scenery where abundant bright-hued flowers are more characteristic. But plants with golden leaves or variegated leaves are alien to our native silva, and when we use them in profusion we introduce a new motive altogether out of harmony with our natural landscapes.

Again, one of the characteristic beauties of an American landscape is its constant change. Between the delicate beauty of the tender leaves of our woodlands and roadside thickets in spring and their rich colors in autumn, there are new pictures every day as the foliage changes in form and color, We have meadows full of buttercups to-day, and daisies to-morrow. Our mountain slopes are now purple with the flowers of Rhododendron, and again pink with those of Kalmias; while from midsummer to autumn Sunflowers and Rudbeckias, Asters and Golden-rods keep our landscapes in continued transformation. For this reason we never tire of them, as we should, perhaps, if the Rhododendrons bloomed all summer through, or if our forests from May until November presented in unvarying profusion the rich colors they show in October. And here is the fundamental defect of the trees and shrubs and plants with variegated and bright-hued foliage. It is not only that their colors are unnatural, but they are unchanging, and consequently to the last degree monotonous and wearying.

Two Southern Botanical Worthies.

COMPARATIVELY little is known of Thomas Walter, an Englishman who wrote, under the title of *Flora Caroliniana*, an account of the plants of South Carolina, where he lived and died. Many years ago Mr. H. W. Ravenel, of South Carolina, published in the Proceedings of the Elliott Society (i., 54) a transcription from the stone which marked Walter's grave in his garden on the banks of the Santee River in St. John's Parish. The stone was erected "In memory of Thomas Walter, a native of Hampshire, in England, and many years a resident of this State. He died in the beginning of the year 1788, Ætatis cir. 48 Ann. To a mind liberally endowed by nature, and refined by a liberal education, he added a taste for the study of Natural History, and in the department of Botany, Science is much indebted to his labors. At his desire he was buried on this spot, once the garden in which were cultivated most of the plants of his *Flora Caroliniana*,

From motives of filial affection his only surviving children, Ann and Mary, have placed this memorial."

Dr. Mellichamp, of Bluffton, South Carolina, now calls our attention to Professor Frederick A. Porcher's History and Social Sketch of Craven County, South Carolina, published in the April number of the *Southern Quarterly Review* for 1854, from which we extract the following paragraph relating to Thomas Walter:

One citizen of this parish has earned for himself a name in the world of letters, and it is strange that Ramsay, who appears eagerly to have sought after Carolinian celebrities, should have entirely ignored his existence. Thomas Walter, an English gentleman whose devotion to the cause of science led him to the wilds of Carolina, was attracted by the charms of Miss Peyre, of St. Stephens, married her and settled there. He devoted himself particularly to the pursuit of botany, and the curious are still occasionally rewarded by a visit to his garden, the ruins of which may still be seen near the banks of the Santee Canal. He is the ancestor of one branch of the Porcher family, and of the Charlton family of Georgia. His book, the *Flora Caroliniana*, which was printed in London in 1789, is dated ad Ripas Fluvii Santee, 30 Dec., 1787.

Dr. Francis Peyre Porcher, the well-known author of the Resources of Southern Fields and Forests, Medical, Economical and Agricultural, who died only a few months ago at a great age, was a grandson of Walter.

In this same article in the *Southern Quarterly Review* is the following note concerning Dr. James McBride, best remembered as a botanist for the assistance he gave Elliott in the preparation of his *Sketch of the Botany of South Carolina and Georgia.*

Science and humanity mourned in 1817 the untimely death of Dr. James McBride. He was a native of Sumter District, South Carolina, and was educated at Yale College, where he was a contemporary of Mr. Calhoun and of our late revered Bishop (Xtopher Gadsden). He engaged in the pursuit of medicine and, settling in Pineville, married Miss Eleanor Gourdin, daughter of The Honorable Theodore Gourdin of that village.

As a physician he was eminently successful, and he was distinguished for sound judgment and a thorough knowledge of his profession. He removed to Charleston to enter upon a wider field of practice, but before he had time to reap any of the promised fruit fell a victim to yellow fever. The opinions of Dr. McBride are treasured to this day and quoted with respect. He had an intuitive perception of truth in matters which were the subjects merely of conjecture, and subsequent researches have proved the accuracy of his judgment. His recreation was botany. He was the friend and correspondent of Elliott and assisted largely in the preparation of the Botany of South Carolina and Georgia. Mr. Elliott acknowledged the obligation, and in the preface of his work has paid a touching and affectionate tribute to one who richly deserved his regard, and could fully appreciate his own genius.

Notes on the Codling Moth.

NOTWITHSTANDING the fact that the codling moth is one of the oldest and best known of the apple enemies, and one which it has been supposed that we long ago knew how to control, it quietly goes on its way from year to year destroying more fruit than any other one enemy, and perhaps more than all other enemies together. It became evident a year or two ago that something was wrong in the generally accepted doctrines in regard to this insect. At the experiment station here and among growers in the state it gave much trouble, in spite of spraying as commonly advised and practiced. Accordingly, in the spring of 1896, observations were begun in the horticultural department to determine, if possible, what was the matter. Much time was spent on the subject and a good deal learned concerning the habits of the larvæ, but not all of the life-history was settled. We looked in vain for the eggs, notwithstanding the fact that large numbers of them were doubtless right before our eyes and passed by unnoticed or as having no connection with the subject in hand. This year we have been more fortunate. Through the assistance of William Nutter, of Gibbon, Nebraska, a large apple grower who has suffered great loss through the ravages of this insect, and who determined to go to the bottom of the subject, we have been able to get large numbers of moths and eggs in profusion. Few entomologists, apparently, have detected the egg of this insect, and the old statement that it was laid in the calyx has been handed down from generation to generation of horticultural literature until Professor Washburn, of Oregon, described and figured it as found on the surface of the apple.

Instead of being laid in the calyx, we find that the eggs are laid almost exclusively on the upper surface of the leaves. Only rarely is one found on the apple or on the under side of the leaves, in the orchard, though in confinement they may be laid anywhere. At least, this has been true up to this time. It may be, however, that the later eggs, when the apples are large, may be oftener found on the apple itself. They are usually found on leaves of a cluster associated with an apple. The egg is about the size of a pin-head and looks not unlike a small drop of milk. Apparently many sterile ones are laid, or the ovule perishes for some cause. These are whiter and more shining than the fertile ones. Just before hatching, a black spot develops in the centre, which is the head of the young larva. When first hatched he is a tiny fellow about an eighth of an inch long, but as spry as a cricket. His head is then the most prominent part of him. He immediately begins to hunt for a hiding-place, and the most convenient one is often that formed by the closed calyx cup into which he enters to begin his work. About eighty per cent. of the larvæ hatched in the orchard during the early part of the season have entered by that means. If two apples hang together or if a leaf hangs over one and close against it that appears to suit them just about as well.

So much for the general habits of the insect, but how to catch it is quite another matter. The orchard on the experimental farm was in full bloom and many petals beginning to fall this year on May 6th, except the Janet, which blooms later than other varieties. Two or three days later the bloom had fallen. About May 10th, then, would have been the time to do the first spraying as ordinarily recommended. The calyx cups were watched in order to determine how long this spraying might be delayed, and still be done before they closed. The first spraying was done May 18th, but had been delayed a little too long, for many of the calyx cups were then nearly closed. Apparently the best time would have been about a week after the blossoms fell, or ten days after the time when the trees were in full bloom. This would have been about May 15th this year, our season having been later than usual. By following the sprayer I found that ordinarily we do not get the calyx thoroughly drenched. For this reason the spray was made coarser than heretofore, and this seemed to work better, particularly when applied with considerable force. It appeared to be easier to get the poison into the cavity when the lobes were wide open than when they had begun to close, making a vase-formed receptacle. The leaves increase in size very rapidly after the blossoms fall, so that on this account the sooner the spraying is done the more thorough is it likely to be. Were there no danger that the poison would be washed out by rains, the best time to apply it would be immediately after the blossoms fall. On some varieties the cup never closes, but on most kinds it was practically closed by May 20th.

But where is the codling moth? At this time, which it will be observed is about the time ordinarily recommended for spraying, there are no worms, and no eggs even. The first eggs were found in the orchard this year on June 3d, though some may have been laid a few days before that. The first larva was found June 12th, large numbers of them appearing from the 12th to the 15th, nearly a month, be it observed, after it was necessary to spray in order to get poison into the calyx cup. Very plainly, then, the success of spraying at that date depends upon getting poison into the calyx cup and having that close over it and holding it there until the larva comes. Therefore, the later the poison is applied while the calyx is still open the better.

Practical experience has proved that treatment at this time is effective. Still this is not a panacea, for if only about eighty per cent. of the worms enter at this point the remainder can abundantly people the orchard in time to get in their work on the winter fruit. What shall be done with this twenty per cent. is the question we are trying to solve; also what shall be done with the surplus moths which may drift across from the orchard of our neighbor who does not spray. Whether later sprayings, which must depend on clinging to the surface of the apple for their effectiveness, will succeed is an unsettled question. Ordinary sprays quickly run off the surface of the apple or gather in little drops, so that they do not form much protection. The addition of lime, soap or a combination with Bordeaux mixture will apparently help this some, but it is impossible to say how much. We hope to be able to answer some of these questions by the end of the season. Still, the fact that the young larva seeks for a sheltered place to begin eating may be of service, for the spray is more likely to cling about the stem or the calyx, or where another apple or a leaf touches the fruit. Another difficulty appears, however. The larger worms simply dig their way into the apple without eating, tearing out and throwing down the pieces of apple. Probably the same holds true of the small ones, which makes the fight more discouraging.

Several lines of warfare are open, however, and I am sure that some of them will prove effectual and practical. The eggs are very easily accessible, being laid as they are on the upper surface of the leaf. In a limited way in laboratory experiments we have found that kerosene emulsion will destroy these, but we are not yet able to say whether a strength that may be safely used will prove effective in field work. We are also trying Bordeaux mixture for the same purpose. Whether the pupæ can be destroyed by any caustic preparation is a question which may well be asked, though it is doubtful, because they are so well protected with their silken covering. This year the first pupa was found June 25th, and great numbers of them were to be found by the 28th. The larva turns a pinkish color when ready to enter that stage and seeks a hiding-place beneath the scales of bark or similar protected spot, not far from the ground, usually within three feet. The rough places in the forks are favorite hiding-places. Some caustic spray or wash at the right time might destroy many of these. Then, too, I believe that the old method of trapping the pupæ with bands has possibilities worth considering. Last year we were able to catch large numbers in this way. A more practical modification of this consists in cutting strips of heavy express paper on a slight curvature, folding it together once and tacking it around the tree. This makes a convenient hiding-place for the insects when ready to pupate. If the loose bark of the tree is scraped away and the trunk kept smooth and clean, these hiding-places would be largely utilized. If applied at the right time they could be left in position a week, quickly gathered up in a basket and burned and replaced by another lot. Two sets ought to answer the purpose and trap nearly all the larvæ which escape the early spraying. Unfortunately, this was overlooked at the right time this year, so that we cannot report upon that point for the first brood. The later broods come along so irregularly that we have found practically one continuous stream of them all summer long.

In confinement we find that the young larvæ eat the leaves readily, sometimes remaining on the leaf where they hatch for twenty-four hours, and eating out quite large pieces. They usually eat away one epidermis and the inner tissue, leaving the other epidermis intact. I am not yet ready to say, however, that they eat the leaves in the orchard sufficiently to make this of any importance in fighting them. We are trying to find this out.

Our experimental orchard is divided into six sections this year. One section is to receive six sprayings, one only the earlier sprayings, one only the later, etc. On June 21st a careful examination was made of trees which had been sprayed previous to that time, as compared with unsprayed trees. The general average of all sprayed sections at that time was about five wormy apples to each tree, as against twenty-seven a tree without spraying. We find our neighbor's orchard the best hunting-ground.

Lincoln, Neb. *Fred W. Card.*

Foreign Correspondence.

London Letter.

Chiswick.—At a special meeting of the various committees of the Royal Horticultural Society, held partly as a Jubilee commemoration and partly for business, Dr. Masters, F.R.S., discoursed on the present state of the Chiswick gardens and made some suggestions for their better utilization, especially for educational purposes. Their educational value might, he said, be increased by discarding entirely all plants of passing interest or of mere decorative value and cultivating only the principal types of fruits, vegetables and flowers. The best methods of cultivation should be followed and everything possible should be done to make the collection of special interest to horticulturists. Patent and other manures should be tested and reported upon and all the now very numerous insecticides and fungicides put upon the market or recommended, chiefly by Americans, should be tried and impartially dealt with. The educational side of Chiswick might be made more of by the adoption of the Kew system with regard to young gardeners; in fact, there was good reason to hope that a plan could be devised by which Chiswick men could attend the lectures, etc., given at Kew for the benefit of the men there, and that the Kew men might enjoy the advantages of Chiswick in return. He was strongly of opinion that progress in horticulture could only come from a scientific study of the principles of horticulture. English gardeners generally worked by rule of thumb. Dr. Masters referred at some length to the experimental and teaching schools recently established in the United States, the work of which was of considerable advantage to horticulture. Sir Joseph Hooker pointed out that these experimental stations in America were state-aided, a condition of things unknown in this country. He thought the efforts being made with a view to affording more scientific training to horticulturists deserved every encouragement.

Examinations in Horticulture.—I have already noted the annual examinations held all over the United Kingdom under the auspices of the Royal Horticultural Society. It will afford some idea of the character of these examinations if I give the questions set and the report of the examiners. The examiners are mostly young, and many of them are not horticulturists. I know that some of the most successful in the list this year know little or nothing of the practice of horticulture, while, on the other hand, some of those who have not done so well are really capable practitioners.

Questions.—Elementary Principles.—A.

1. What are the three chief mineral ingredients of a soil? Name garden plants or shrubs which delight—each kind respectively.

2. What differences may be expected from growing unripe, perfectly ripe, and long-kept seeds respectively?

3. In transplanting, why is it necessary to preserve the extreme and most delicate tips of the root-fibrils?

4. Why does covering rhubarb redden and lengthen the leaf-stalks and stop the growth of the blade?

5. Describe the structure of a Hyacinth bulb, and explain why the Dutch method of slashing or hollowing out the bottom induces the formation of bulbils.

6. What are the essential conditions for successful grafting?

7. How does the structure of a plum differ from that of an apple? Explain the origin of each.

8. Name the natural orders or families to which the following plants belong: Cyclamen, Rhododendron, Clematis, Stock, Pelargonium, Borage, Potato, Onion, Parsley and Turnip.

Division B.—Horticultural Practice.

9. Explain the process of cross-fertilization in garden flowers,

and give examples of both hardy and exotic plants that have been improved thereby.

10. After seed of the Chinese Primula has been ripened describe the method of sowing and subsequent treatment of the plants up to the period of their flowering.

11. What is the native country of the Celery-plant, and under what conditions does it grow naturally? Give a short account of its culture, such as time of sowing and subsequent treatment.

12. When and under what conditions is Sea Kale found in a wild state? Describe its culture and state the time of the year it is in use.

13. Where is the common Asparagus said to be found in a wild state? State all you know of its culture, and for how long a period it may be had in use.

14. Give an account of the Apple. How are the trees propagated? State what you know of its culture, and the diseases to which the trees are liable, and the remedies. Name one good cooking variety for use in each month from August to April inclusive.

15. State all you know about the Raspberry. What sort of soil is best adapted to its culture? Give method of training and pruning, and the best varieties to cultivate, both yellow and red.

16. Give an account of the usual method of Gooseberry-culture adopted in gardens; and also the Lancashire method to obtain prize fruit. Name six of the best prize varieties and six best for ordinary garden culture.

The examiners were the Rev. George Henslow and Mr. J. Douglas, and they have reported to the Council of the Royal Horticultural Society as follows:

We beg leave to report that we have examined the papers submitted to us—in all 184. Of these we selected 89 as worthy to be placed in the first class, 55 in the second, and 28 in the third. The remainder, 12, are not placed; the number of marks attained being below 100. These results are most encouraging. Speaking generally, the answers are extremely well done. The information is accurate upon the whole, and the subject-matter well expressed. Perhaps the practical horticulture showed, as might be anticipated, a slight superiority over the elementary principles.

A Variegated Plane.—Mr. J. Russell, nurserymen, Richmond, obtained a first-class certificate last week for a beautifully variegated variety of Platanus acerifolia. It was shown and certificated under the name of P. occidentalis argentea variegata. The young leaves when fully developed are colored a clear creamy white, or striped and flaked with that color on a green ground. Ultimately they become wholly green, so that a plant in good condition is clothed with rich green leaves, and on the young shoots either white or variegated leaves, so that at a short distance off the plant appears to be in flower. Mr. Russell says his plant is a seedling sport which originated in his nursery. It appears to be identical with P. acerifolia, var. Süttneri, which has been known and grown for at least twelve years at Kew. There used to be two large trees, said to be fifty years old, of a variegated Oriental Plane in the public park at Buda-Pesth. As grown in Mr. Russell's nursery, where the plants are perfect pyramids six feet high, this Plane is most ornamental.

Plagianthus Lyallii.—This beautiful New Zealand shrub is flowering freely at Kew this year, where it is grown against an east wall and also in the open border, the latter position being most favorable this season, probably because of the mildness of the past winter. It has thin twiggy branches, ovate cordate dark green leaves and numerous axillary clusters of pure white flowers each an inch across, and borne on a long, slender, drooping pedicel, in effect not unlike the double Cherry. Under glass we have never succeeded in flowering this plant. It appears to require a sunny, airy position sheltered from cold winds and severe frosts in winter.

London. *W. Watson.*

The wild shrubs which skirt the waysides have a beauty beyond that of the cultivated exotics in spaded gardens; they cover the nakedness of stone walls with foliage and flowers; they give shelter to the birds and fruit for them, which is also a luxury to the children; they protect adjacent farm lands from winds and constitute the most interesting embellishment of a rustic farm.—*Wilson Flagg.*

New or Little-known Plants.

A New Hickory—Hicoria pallida.

In its relation to the other Hickories, Hicoria pallida is nearer to the Nutmeg Hickory than to any other, but while the Nutmeg Hickory, Hicoria myristicæformis, has many characters which ally it to the Pecan and Bitternuts, this has characters which show close affinity to the White Hickory. The sterile flowers of Hicoria pallida are only from the base of the shoot of the year, while in the Nutmeg Hickory they are from separate lateral buds as well. There are in both seven or nine rather small ovate-lanceolate leaflets which are covered on their lower surface with silvery peltate scales. In Hicoria pallida these scales are also found on the sterile inflorescence, covering the peduncles, bracts and calyx-lobes, on the young twigs and on the petioles, and this in the early spring gives a brilliancy to the foliage when the sunlight falls upon it that renders it very conspicuous. Although these scales are persistent on the leaves they become dulled and lose their lustre by the middle of summer. Covering the buds and young fruit and mixed with the scales on the lower surface of the leaves are resinous globules similar to those which occur on Hicoria alba, and which render the young foliage of that tree so fragrant. The divisions of the calyx of the pistillate flower which subtend the very large stigmatic lobes are broad and covered beneath with tufts of purplish hairs, the young fruit being like that of Hicoria minima, but larger. The petiole is covered with tufts of coarse yellow or brownish hairs, which add greatly to the resemblance between the foliage of this tree and that of the White Hickory, as both have about the same number of leaflets; those of the White Hickory, however, are somewhat larger and are a lighter and a brighter green.

The twigs, which are even more slender than in most forms of the Pignut, are purplish brown in color, marked with few oblong, light gray, but rather inconspicuous lenticels, and are usually smooth, although some collected in southwestern Georgia are tomentose toward the tip around the base of the terminal buds. The oval buds are sharply pointed, and are borne on an evident stipe; the lateral buds are similar to the terminal in shape and general appearance, but are somewhat smaller. The terminal are enfolded in from six to nine imbricate scales, and the lateral in from five to seven; while the number of scales in the terminal bud of the Nutmeg Hickory seldom exceeds five or six, and in the lateral bud four. Although the scales are imbricate, they lengthen but little in exfoliation. The outer are nearly glabrous on the back, but the inner are covered with a close fine pubescence. Sometimes there are coarse tufts of hair on either side of the midrib of the leaflets, but this is not always the case; whenever present it is persistent.

The fruit, as in most of the Hickories, varies much in shape and size, being sometimes almost globular, and again nearly pear-shaped, frequently assimilating forms of the Pignut or White Hickory. The usual form is subglobose, with a nut of nearly the same shape, barely apiculate at the bottom and subcordate at the top. The husk in this form is thin, less than one inch thick, and splits nearly or quite to the bottom, freeing the nut, or remains on the tree until the middle of winter without splitting at all. Another form resembles closely the pyriform fruit of the Pignut, the thin and indehiscent husk prolonged at base into a slender apophysis. The nut of this form is oblong, nearly circular in cross-section and mucronate at the base. It is seldom found over three-fourths of an inch long, and is not at all angled. In another form the fruit is nearly globular; the husk is over one-eighth of an inch thick and is wing-margined along the sutures. The nut is laterally flattened, angled, sharply pointed at both ends, and is about 1.5 inches long. The nuts of the last form resemble those of

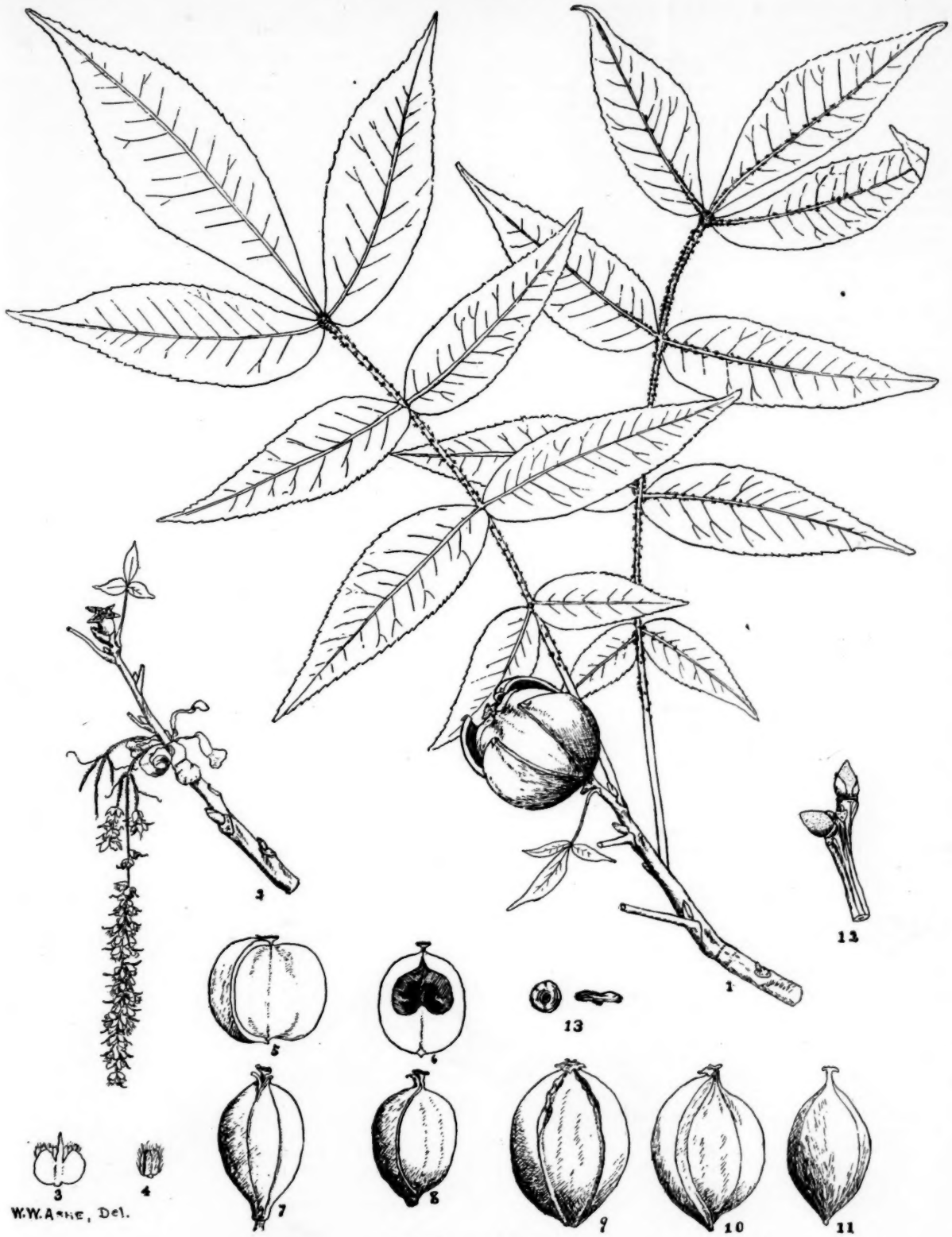

Fig. 39.—Hicoria pallida.—See page 304.

1. Fruiting twig of a typical nine-leaved form of H. pallida, natural size.
2. Flowering twig, showing fertile and sterile flowers and persistent bud-scales, natural size.
3. Calyx of sterile flower, enlarged.
4. Anther, enlarged.
5. A nut-form peculiar to H. pallida, natural size.
6. Nut split at the commissure, natural size.
7 and 8. Nut-form which approaches that of H. glabra, natural size.
9, 10 and 11. Nut-form which approaches that of H. alba, natural size.
12. Tip of twig showing winter-buds, natural size.
13. A peltate scale-scurf, magnified about twenty-five diam.

the White Hickory, and are the least common. All the nuts are white or yellowish in color, have thick hard shells and are four-celled at the base.

From its habit Hicoria pallida might be called the "Black Jack" of the Hickories, for it seldom exceeds forty feet in height, and is often not over eighteen or twenty, with a proportional trunk diameter of from eight to fifteen inches. The very slender upper branches are erect and closely crowded, forming a narrow, oblong crown; but the lower ones droop so low that on isolated trees their extremities are only a few feet above the ground. The trunk, too, is always short, even when the tree is growing under the most favorable conditions, most of the branches spreading from a point only fifteen or twenty feet above the foot of the trunk.

The gray bark is thick and firm, with deep and rather broad fissures separated by broad, irregularly anastomosing ridges, its general appearance being like that of the White Hickory, but rougher. In the summer, when in foliage, it bears a close resemblance to the White Hickory in all the characters which a coup d'œil can gather; in the winter the slender twigs make it more nearly resemble the Pignut. The heart-wood is brown in color; the sap-wood nearly white; and I was told by persons who had used the wood that while much inferior to the White Hickory in those properties that make good hickory, it is equally as good as that of the Bitternut. The tree, however, is too small and too infrequent to be of importance economically.

Even in the mountains of North Carolina, where I have found Hicoria pallida most common, it is exceedingly local, occurring at widely separated places and seldom more than a dozen trees being found at the same station. It prefers a poor, dry, soil; and I have usually found it on sandy soils, although not always.

In the mountains of Virginia and North Carolina it is associated with the Red Oak, the Rock Chestnut Oak, the Pignut and White Hickory, and ascends in the mountains of North Carolina as high as 4,000 feet above sea-level. In south-western Georgia it is found growing with the White Hickory, Post Oak, Dogwood and Long-leaved Pine on a good, loamy soil underlaid with marl and limestone. In eastern North Carolina it is found on the littoral sand dunes at Wilmington, growing with the Sand Oak, Quercus Catesbæi, the Spanish Oak and the Red Cedar; while near by are the Water Oak, Live Oak, Laurel Oak and Bays. On the sandstone ridges of central Tennessee it occurs with the Scrub Pine, Chestnut, and with the Oak and Rock Chestnut Oak.

Its distribution, so far as I have observed, is from southern Virginia and eastern North Carolina to middle Tennessee and south-western Georgia; but it is probably more extensively distributed and should be looked for in eastern Kentucky and northern Alabama.

This tree was first distinguished in the spring of 1895 near Chapel Hill, North Carolina, where, after two seasons' search, I have been able to locate only three specimens. The summer after distinguishing it at Chapel Hill, while examining on horseback the forests of the western portion of North Carolina in the preparation of the description of the woodland of North Carolina in Bulletin No. 6 of the North Carolina Geological Survey, I found this tree in several other places in that state. The following spring it was found in south-western Georgia and eastern North Carolina, and more recently in Tennessee. Having no good description of the Nutmeg Hickory or specimen for comparison for a long time, I considered Hicoria pallida to be that species, or at most a variety of it. The Nutmeg Hickory, however, does not occur in North Carolina, although indirectly credited to this state in the recently published *Nomenclature of the Arborescent Flora of the United States*.

From what is now known of it Hicoria pallida seems to be another localized, south Appalachian species.

North Carolina Geological Survey. *William Willard Ashe.*

Cultural Department.

Border Plants.

RUDBECKIA TRILOBA, var. Golden Glow, is now in bloom. It is a questionable acquisition. The color is not nearly as bright as that of our double Helianthus multiflorus, nor is the flower as finely formed. The single form of this Rudbeckia is handsomer, with a ray of yellow florets and a black disk. Compared with the Sunflower, it makes a much better border plant, as it is perfectly hardy, stiff in habit and stands without stakes and has handsomely cut foliage.

Hybrid Montbretias are acceptable hardy plants. They are usually treated in the same way as Gladiolus, and the corms lifted and stored dry during winter. With no thought that they would prove hardy, a batch was left out under cover of a few leaves and Pine branches; these plants are more vigorous than those from lifted corms and bloom earlier. Just now their gracefully arching, compound spikes of scarlet and yellow flowers form part of an attractive picture, with dwarf Sunflowers for a background and Heliotrope for the front. Probably the late-flowering Hemerocallis Thunbergii could be used in place of the Sunflower with better effect, H. fulva in the border becomes a weed sometimes, but properly used among shrubs it is a striking plant, handsome in foliage as well as flower.

Among a number of seedling Carnations we found one with perfectly formed white flowers on long stiff stems. It came among seedlings of Mrs. Fisher, a standard florists' variety of the tree or perpetual type, but, as often happens, this variety had reverted to the border type, and for winter flowering it was useless. Pipings put in during the late summer, when rooted, boxed off and wintered in a cold frame, according to the English practice, and planted out in spring, make neat plants and bloom finely, earlier than standard varieties rooted in the winter. It is complained that we have no border varieties to compare with such as are grown on the other side, but I think if our florists who raise new varieties would save some of the reverted types, and prove them, we might get together a collection embracing all the colors.

Lobelia fulgens, var. Victoria, is an admirable border plant for the autumn garden. It will be strikingly effective in a week or two when the Phloxes are gone and golden colors predominate in the borders. It is remarkable for fine dark foliage and brilliant scarlet flowers. Besides being an unusually attractive border plant, Campanula grandiflora has the good quality of coming into bloom when nearly all other kinds are past. The variety Mariesi is probably the best of all, and, with its white form neatly blended, will continue for a long time. This Campanula is also an excellent plant for the rock garden, where now and then a taller plant varies what would otherwise be a monotonous carpet of low plants. They sow themselves quite freely. Pentstemons from seed will soon be in bloom. Those from cuttings from a few selected plants rooted last winter have been flowering for the past three weeks. They add variety at a time when the borders begin to look bare; besides, a stock of young plants in spring-time comes in handy to fill occasional bare spots.

Old plants of Pyrethrum roseum hybrids bloom sparingly now, and a batch of seedlings raised in winter are just coming into bloom. They will be mostly single, but showy, as bright colors prevail. Erigeron speciosus, with purple Aster-like flowers, is very bright. In our warm sunny climate the plant frequently exhausts itself in bloom, and should be treated as a biennial. It is easy to keep up a supply, as seeds ripen and germinate freely. In fact, it is not uncommon to find numbers of self-sown seedlings come up in the vicinity of old plants every spring. Hypericum aureum is a good low-growing shrubby American species. It is an excellent plant for the foreground of the mixed border where herbaceous plants are used. It is quite stiff in habit, and its flowers occur in bunches near the ends of all the branches. Delphinium Sinense has a much longer season of bloom than hybrids of D. elatum. Its deeply tinted blue flowers are scarcely equaled in intensity. Dicentra formosa lasts a long time in bloom, and a shady position suits it best. Here we have it behind a large rock, and it does equally well in the shade of trees if moisture enough is supplied. The delicately cut glaucous foliage and arching scapes of pink flowers resemble those of Scilla campanulata rosea, and contrast beautifully.

Malva moschata is exceedingly free; in fact, flowers on to exhaustion, and should be cut back when it begins to form seeds. Pink and white saucer-shaped blooms are produced in succession on short stems from the axils of the leaves. Linaria Dalmatica, a rather new Toadflax, with glaucous leaves and

comparatively large flowers, is not as ornamental as our roadside Butter and Eggs, L. vulgaris, but has the good quality of being a perennial. Masses of Monarda didyma are effective and sure to please those who want a border plant which will take care of itself. The whorls of red labiate flowers come near the tops of the stems and give the appearance of heads of bloom. It needs watching, or it will crowd other plants. The majestic Veronica longifolia subsessilis, where it succeeds, is a splendid border plant. It delights in a good deep soil, and in a situation where it is fully exposed will grow four feet high. It is the finest of all the Speedwells and the latest to bloom. Hydrangea radiata has little in outward appearance to suggest relation to any other Hydrangeas we know. It is sub-herbaceous, sending stout stems up every spring clothed with blue-green ovate leaves, downy beneath, and terminated with large flat corymbs of fertile flowers. Here and there a sterile flower may be noticed, but there are not enough of these to attract attention. In appearance the flowers resemble those of the common Elder. Here also is the true H. paniculata, a much stouter plant than the variety Grandiflora commonly seen. The light graceful panicles of the species are a relief, for it must be confessed that the big lumpy heads of the variety Grandiflora become a trifle wearisome in the late season, since they display themselves in almost every door-yard, although a large and well-grown plant is very showy when it stands alone with plenty of room.

Wellesley, Mass. *T. D. Hatfield.*

Herbaceous Perennial Plants in Flower.

LATHYRUS LATIFOLIUS, or the Everlasting Pea, should have a place in every garden where herbaceous perennials are grown. The typical plant is not as showy as some improved forms found in cultivation. Those grown here and in blossom now reach a height of five or six feet in a medium rich soil and open position. When the plants are about a foot high a few loose branches should be set about them to clamber upon. Grown in this way the flowers are produced for many weeks. These are of a dark rose color and borne in clusters of about twelve on long peduncles which measure six or nine inches in length. The variety albus makes a good companion, as it is similar in all its parts, but it has flowers which are of a white so pure that it may be called dazzling. The white-flowered form is rather more difficult to keep than the type, but both are invaluable for cutting purposes.

In the front row of the herbaceous border where the soil is light and in a sunny position, Stokesia cyanea proves itself one of the best of the showy composites of the season. It is slightly above a foot in height, branched, and the branches are terminated with bright blue flower-heads not unlike Chinese Asters. Although it is sometimes considered not quite hardy in this locality, there are plants in this garden which have been grown successfully in the borders for several years, probably because the situation and exposure are just suited to their needs.

The Wall Germander, Teucrium Chamædrys, is completely covered with its reddish purple flowers and makes an excellent plant for a dry, sunny position, either in the rock garden or the front row of the herbaceous border. Its flowers are produced in leafy terminal spikes and the individual flowers measure about three-fourths of an inch in length. The stems are six or eight inches high and rise from a creeping root-stock. This compact, dwarf, showy perennial comes from Europe and is quite hardy here and well worth extended cultivation. Another species of Germander grown here for some years is also worthy of notice for its showy flowers. It is known as Teucrium Hyrcanicum, and, although introduced into cultivation from Persia as long ago as 1763, is but little known in America. In the border the plants become twelve or fifteen inches high, and the stems are clad with ovate-cordate deeply crenated, slightly pubescent leaves. The purple flowers are in dense spikes about six inches long, and a plant with a dozen spikes or more is pleasing and effective. It enjoys a light warm soil in a sunny position. Our plants were raised from seed four years ago and have proved quite hardy without any protection in winter.

Of a large number of species of Mullein grown here the best and most satisfactory perennial among them is Verbascum nigrum. Another good perennial, which, however, cannot be relied upon to flower every year, is V. Olympicum. If this species would flower as freely as some of the other kinds it would hold first rank, and, indeed, few perennials would compare with it. On the other hand, V. nigrum is an exceedingly floriferous plant, and is almost constantly in flower from July until frosts destroy the blossoms. It grows about four feet high and the stems are clothed with long cordate leaves. The flowers are produced in branched racemes; the corollas are yellow and the filaments of the stamens are covered with bright purple hairs. It grows well in any good garden soil, but does best in an open sunny position.

The Japan form of Veronica Virginica, which we have grown from seed obtained from the Kew Gardens two years ago, proves itself, with longer acquaintance, to be an excellent perennial. Last year the plants did not grow as tall as the type plant, our native species, but this season they are quite as tall and as vigorous. The main difference is in the time of blossoming, and the Japanese form is five or six weeks earlier than our North American plant. The best blue Veronicas now in blossom are V. longifolia and some of its varieties.

A large mass of Oswego Tea, Monarda didyma, is ornamental and effective grown on the lawn. The bright scarlet flowers are produced in whorls on the ends of the stems, which are about a foot and a half high. The Wild Bergamot, Monarda fistulosa, and some of its varieties make good border plants when grown in large clumps. The flowers of this species are purple and the stems grow slightly taller than those of M. didyma. M. Bradburyana is the neatest and most compact plant in the genus for gardening purposes. The stems are about a foot in height, terminated with pink flowers and reddish bracts. The Monardas are thrifty plants, increasing rapidly, and their flowering season is of long duration.

A few weeks ago, in the back row of the herbaceous border, large well-established plants of Clematis recta were loaded with white flowers. This plant is the best of the upright Clematises. It is an excellent hardy perennial, growing freely in almost any ordinary soil or situation, and is but little troubled with insects. There are a number of varieties of this species, and all are desirable garden plants. The reason for writing about it now is to recommend a late-flowering variety grown here, and known as C. recta, var. umbellata. It differs from the typical plant in having longer and narrower leaves, and its season of blossoming is two or three weeks later, thus giving us a longer blooming season of this desirable Clematis. C. recta and its varieties do best if not disturbed often. My experience with them is that after being disturbed they do not grow so strong or attain their ordinary height until the second year after transplanting.

Campanula persicifolia is an old-fashioned plant with blue flowers, but there are few new perennials that can compare with it, and it should be included in every collection of hardy herbaceous plants. There are numerous varieties, and that named Alba grandiflora is particularly floriferous and makes a fine display. If the flower-stems of this Campanula are left on the plants after they have blossomed in early summer they will produce a fairly good second crop. Our plants are now blossoming for the second time this season.

If mixed borders are backed up by shrubs, Bocconia cordata is effective in such a position. The individual white flowers are not very striking nor handsome, but the large terminal panicles are always effective. This Japanese plant grows with the greatest freedom and increases rapidly. The stems reach to a height of six or eight feet and are thickly set with large glaucous leaves. The desirable Pentstemon barbatus, var. Torreyi, has done remarkably well this summer. Its long, wand-like inflorescences are graceful, and the bright scarlet color of the flowers always attracts attention.

Harvard Botanic Garden, Cambridge, Mass. *Robert Cameron.*

Hybridizing Caladiums.

AMONG the fancy-leaved Caladiums there are several varieties that are constituted so as to endure the full sunshine all day long, but most of them lack the bright coloring which gives these plants their value. The leaves are for the most part green, as, for example, C. Wightii, C. Duchartrei and Queen Victoria. There are a few brilliant-colored ones which do almost as well in the sun as the green kinds; three of the best are Rossinii, Perle de l'Exposition and Uranus, but the great majority of the showy kinds are not suited for outdoor decoration.

Some of those kinds which have done best out-of-doors for the last few years were set apart at the beginning of the season for hybridizing purposes in order to see if by crossing them a greater variety of color can be had. The operation has been a successful one so far as it has gone, and as it is exceedingly simple, a description of it might interest some fanciers of these plants. The tubers, as a rule, send up their flowers shortly after they are started into growth in the spring; large-sized tubers are very apt to flower after the first leaf is developed. The flowers are arranged on a spadix; the stamens occupy the upper portion which, when shedding their pollen, are exposed to view, but the ovaries, which occupy the lower

part of the spadix, are concealed from view by the lower half of the spathe, which is usually contracted near the middle, forming a tightly closed little chamber over the seed-bearing part. The female organs arrive at maturity in advance of the males on the same spadix by several days; there is, therefore, little danger of self-fertilization. In order to have access to the pistils it is necessary to cut an opening through the walls of the little chamber. The proper time to do this can only be judged by the size of the spathe, but if the stigmas are not ready for the pollen a delay of a day or two makes little difference, as the perfect condition of the stigmas is indicated by a viscid substance covering them. The pollen is at its best for transferring easily in the forenoon, say from ten to twelve o'clock, and at that hour, having selected the pollen-bearer, nip off the entire inflorescence. This must be done carefully, as the pollen falls off at the slightest touch, and therefore, before nipping it off, incline it so that the pollen will fall into the cavity formed by the upper part of the spathe. Then with a camel's-hair brush convey a little of the pollen to each of the stigmas, and after this is done tie up the inflorescence to a support, so that with increased weight when the seeds are ripening it will not fall over the side of the pot and break off. A hanging label is affixed with the names of both seed and pollen bearing parents. The seed is ripe in from two to three weeks; it is quite small, yellowish-white in color, and germinates in shallow pans well drained and filled to within an inch of the rim with a mixture of loam and sphagnum in equal parts rubbed through a fine sieve. The seeds were barely covered and pieces of glass were kept on during the warm part of the day to prevent a too rapid drying out. In a few days the seed leaves appear, and at this stage they look to any one not familiar with seedling Caladiums like young turnips, each one having a cotyledon missing. The first true leaf, however, shows the identity of the plant, although it is a trifle rounded. It is green in color, as is also the second leaf, the third showing the first indications of other colors. This occurs invariably in the middle of the leaf, being either white or dull red. This is the stage in which the seedlings are at present; they are growing in thumb-pots, three in each pot, and are a healthy-looking lot.

Botanic Garden, Washington, D. C. *G. W. Oliver.*

Notes on Flowering Plants.

FORTUNATELY for the grower, few gardening operations are pressing in midsummer if the work of the early months of the year has been done systematically. But at all times success depends largely on attention to details, and some of these must be seen to now. Plants of different kinds to furnish flowers for cutting in winter are essential on a private place, and considerable management must be exercised to find room for sufficient stock in the limited space usually at command.

Roses in pots and boxes out-of-doors in preparation for winter-forcing are still growing freely, and with the abundant rains we have had in this section are likely to grow for some time to come, for it will take a considerable time to harden and ripen this sappy growth. Carnations grown out-of-doors are also liable to suffer somewhat from too much moisture, for the growth is soft and naturally more open to fungoid attacks. The plants should be closely inspected when they are being replanted under glass about a month hence. In a changeable season such as this has been the practice of growing Carnations under glass throughout the year is likely to prove the most satisfactory.

Bouvardias for cut flowers have often been deservedly noted in Garden and Forest. The chief point in their care at this season is frequent pinching to develop a bushy habit; the time for the last pinching depends upon the season when it is desired to have them in bloom. Planting out in a rather sandy but rich soil is decidedly better for Bouvardias than pot culture, and results in much larger and stronger plants. There is also less trouble from red spiders and other insects. But as these plants are susceptible to cold they should be brought under cover early, usually not later than the 15th of September in this locality.

Cytisus and Acacias should now be making sturdy growth outdoors in the full sunshine. They enjoy bountiful watering during bright weather, but free drainage of the pots is necessary, for all plants of this character are impatient of stagnant water at the roots. The same treatment applies to Azalea Indica, which should be plunged in coal ashes or other cool material for the protection of the tender roots, and have full sunshine to ripen the growth and an abundance of water to perfect the flower-buds. Peat and leaf-mold are no longer considered absolutely necessary as the main part of the compost for Azaleas, so that the cost of such material and the difficulty of securing it need not deter any one from attempting their cultivation. Admirable specimens have been grown in a good fibrous loam. Chorozemas, Cestrums and Reinwardtias should be included in stock useful for conservatory decoration and for cutting during winter and spring, and all of these may be grown to advantage out-of-doors through the summer. The growth thus made is short-jointed and better ripened than that of plants kept under glass the whole season. Stevia serratifolia and one or two of the Eupatoriums, notably E. riparium and E. triste, are also useful for cut flowers and require but little care. Spring-rooted cuttings potted on before the growth became stunted and finally shifted into six-inch pots are of convenient size, and after the main crop of bloom has been cut the old plants may be thrown away to make room for other plants. Plenty of water and frequent pinching to induce compact growth are the main requirements for Stevia and Eupatorium, and when the plants are plunged out-of-doors the pots should be twisted around once a week to break off any roots that push through the bottom.

Mr. Orpet's note about Poinsettias in a recent issue is plain and practical. I heartily agree with his method of outdoor cultivation, which produces much more stocky plants and of stronger constitution than those grown under glass continuously. Euphorbia Jacquinæflora may be grown in the same way, but as this plant seems to suffer from indigestion at times, and often fails suddenly, it is probably safer to keep it indoors.

Begonias for winter cutting, of which B. incarnata, B. Saundersii, B. rubra and B. nitida are among the most useful, should be grown on in pots from spring cuttings unless a short section of bench can be spared for planting them out. The latter plan has the advantage in producing a greater quantity of bloom from a given number of plants.

Bulbs of Lilium Harrisii are already in the market, but the first consignments are not always the best, and unless New Year blooms are desired, it is preferable to wait a little longer for the bulbs. In any case they should be potted as soon as received, for these bulbs suffer from long exposure to the air.

Holmesburg, Pa. *W. H. Taplin.*

Correspondence.

Wintering Hardy Plants in Vermont.

To the Editor of Garden and Forest:

Sir,—The last winter was a good one for testing the relative hardiness of all kinds of plant-life in Vermont. As a rule the coldest weather here is preceded by snow, so that the ground is well protected from the lowest degrees of cold. But last winter the coldest weather came with bare ground and it was frozen to a great depth. Many plants that had been wintered here in good condition in former years were entirely killed, while others not killed outright were so put back as to require a full season in which to recover their former strength. Many of the more tender Lilies were entirely killed when not situated in sheltered places or protected, and others which were not killed outright were so injured that the blight soon finished them. The outer scales of the bulbs of L. auratum were so frozen as to become rotten when thawed out in spring, and though the shoots came up and at first appeared strong as usual, they were early attacked by blight or some disease and soon succumbed. Bulbs of L. longiflorum and its varieties were generally killed outright, and those of L. speciosum were also killed where exposed to the coldest winds. In sheltered places or where covered with a mulch this species did not suffer. Our native Lilies, like L. Canadense and L. superbum, are usually among the first to be attacked with blight, except L. candidum and L. excelsum, which with me have been the the first to show it. But I have noticed this year that the hardier kinds, like L. tigrinum, L. Canadense, L. superbum, etc., have shown almost no blight, while others more tender, which in former years have been comparatively free from it, have suffered more. It is natural to conclude that the reason for this is largely due to the injury from severe cold. I am glad to state that the L. Henryi has proved not only quite hardy, but remarkably free from blight, and may be counted as one of the most reliable hardy Lilies. None of the Tiger varieties have shown more vigor than this.

Lilium Krameri, which has been wintered in the ground in previous years, was wintered in soil in the cellar. It had usually been so injured by the fall rains that we tried this method, which has been a great success, for not only did nearly every bulb come through in perfect condition, but

almost all have bloomed and been much freer from blight than usual. I shall hereafter winter this bulb in this way.

Among the hardy plants Anchusa Italica was entirely killed where not well covered; and such species as Bocconia cordata, Coronilla varia and Lathyrus latifolius, Perennial Pea, were killed to a considerable depth, and though they have finally come up from a lower portion of their roots they are not of their usual size or strength. Bocconia was entirely killed to the depth of a foot. Below this the root had life and has come up. Coronilla, though a little quicker in recovering, was killed to about the same depth. Hibiscus Moscheutos in moist places was killed outright; in drier soil young plants survived. Cassia Marilandica in moist ground stood the weather, but in the same rows on a little higher ground was killed. Aletris farinosa was entirely killed. The upper portion of many of the roots of Asclepias tuberosa were killed, and though they generally come up from below they were very backward. Bellis perennis, which had been wintered here in previous years, though well covered, was entirely killed. Helianthus Maximiliani has wintered well heretofore, but not a plant has come up this season. Helleborus purpurascens, which had wintered in perfect order for two seasons, was about all killed, as was H. niger. The double Hollyhocks, as a rule, though well protected, were killed. The hardier sorts of Foxglove, such as Digitalis grandiflora and D. Sibirica, which had always been considered perfectly hardy here and which had established themselves in strong clumps well protected with a good growth of their thick leaves, were generally killed.

Ligustrum Ibota has wintered here previously in good condition, but was killed outright last winter. Only now and then a plant has sprouted at all from the root. The California Privet was also badly killed back in its branches and is not so strong or promising as a year ago. The common Privet, L. vulgare, came through pretty well and shows little damage.

Charlotte, Vt. *F. H. Horsford.*

A Plea for Zinnias.

To the Editor of GARDEN AND FOREST:

Sir,—This year my garden is without Zinnias, and their absence convinces me of their usefulness. They deserve a place in the shrubbery, where they furnish an embroidery of color during the season when few shrubs are in flower. But their chief usefulness is to furnish cut flowers from late July until frost. One hardly appreciates their range of color until one has had a large stock of them to draw upon for floral arrangements during the season. Besides the common orange-scarlet group, a packet of good mixed seed will give rosy scarlet and salmon-scarlet of different depths, almost pure orange, yellow, straw-color, deep crimson, rose, exquisitely pure pink, flesh-color and several light tints that a little child has defined as "dark white," and which, perhaps, may best be described as ivory, pale lemon and greenish white, some flowers of the latter tint being almost pure white, so that a light tone is found that will harmonize with any of the color divisions.

With such a stock of Zinnias to cut from there is always at hand the necessary basis for a bouquet, for it only needs two or three spikes of Gladioli in harmonizing tints, some sprays or trails of any one of the small-flowered Clematises or of the Cinnamon Vine, or heads of Gypsophila paniculata, to make an attractive and often a distinctly beautiful bouquet in any one of at least three colorings. These hardy flowers are usually available, and if the arrangement is varied by the introduction of a stalk of splendid Tiger Lilies, two or three great Golden-banded Lilies, half a dozen flowers of Lilium speciosum, either white or rose; Dahlias of various colors, a few belated spikes of Delphinium or some purple bells of Cobæa scandens, or if in an arrangement of yellow tones, a cluster of snowy Day Lilies or some sprays of showy Salvia splendens are added it will be seen that a succession of extremely effective bouquets will have been evolved from rather meagre materials. For throughout the three months or more that these supplemental flowers are coming into flower the Zinnias will steadily supply the foundation for the series.

Brighton, Ill. *Fanny Copley Seavey.*

Recent Publications.

The Principles of Fruit-growing. By L. H. Bailey. The Macmillan Co. New York.

Professor Bailey has been preparing a monograph on the Apple, and in the course of his work it became clear that many of the essentials of the science and art of pomology could be grouped together so as to be applicable to all kinds of fruits, and this volume is the result. Its range and purpose, therefore, is precisely defined by its title. It is a discussion of the principles which underlie the successful production of all kinds of orchard fruits, and, indeed, most of the small fruits. Probably there is more fruit consumed in the United States than in any other country of the temperate zone, and the desire for fruit is still rapidly increasing. Neither is there any country in the world where fruit is produced in such abundance, variety and excellence, and yet it is probable that fruit, in spite of an increasing demand, will grow cheaper rather than dearer. It would seem impossible that grapes, for example, can be raised profitably for a price lower than the present average, and yet in growing all kinds of fruit there must be a constant effort not only to lessen the cost of production, but to improve the quality of the product. This book is an attempt, not only to establish the laws which must be followed if the best fruit is to be grown at paying prices, but it explains the limitations of climate and of location, which make fruit-growing a hopeful industry in one region and a doubtful one in another. The study of the geography of a fruit farm with reference to markets, to threatened frosts and the conditions which make them dangerous, to winds and air currents, to atmospheric drainage and other physical conditions, is full and, of course, instructive. Equally important is the chapter on the evolution of tillage, in which such subjects as the texture of the soil—that is, its physical condition, as distinct from the amount of plant-food it contains—are treated, together with all the operations necessary for the conservation of moisture, even down to minutiæ of detail. Of course, all the elementary facts which it is necessary for a fruit grower to know in relation to diseases and insects are clearly set forth, and we are glad to see that a most interesting bulletin of the Cornell Experiment Station on the general subject of spraying is largely incorporated into this chapter. Points of practice, like the laying out of grounds, the selection and setting of trees, choice of varieties, the proper methods of fertilization, with the latest methods of harvesting and marketing, are given with clearness and precision. Altogether, this is one of the best numbers of the admirable Rural Science Series, of which Professor Bailey is the general editor. Books like this go far to remove the reproach that there are no available manuals for the farm and garden in America which are at once practical in their directions and thoroughly scientific in their methods.

Notes.

Six steamers from Central America landed 115,800 bunches of bananas at this port during last week.

A correspondent of *The Gardeners' Chronicle* writes of a Scotch Pine not far from Southampton with a stem clean and handsome and measuring thirteen feet in circumference four feet from the ground. The trunk is as round as a ship's mast, and does not divide until forty feet from the ground, when it is capped by a fine round head.

At a special meeting of the New York Gardeners' Society the prizes awarded at the June exposition in the City Hall were distributed. It was decided to hold an exhibition of Cannas and other flowers in connection with the annual dinner of the society on the second Saturday of September, and to hold a Chrysanthemum show in November. Some good seedling Cannas, raised by Mr. A. L. Marshall, of Pawling, were exhibited, and one of them, a large deep crimson flower, named John B. Dutcher, received the society's certificate.

In the first volume of GARDEN AND FOREST (page 499) we gave an excellent illustration of a fruiting branch of Elæagnus longipes, and in the descriptive note accompanying it stated that the shrub was well worth growing "for the beauty of its fruit alone, which, moreover, is juicy and edible, with a sharp, rather pungent, agreeable flavor." We also suggested that the quality and size of the fruit might be improved by selection and become a highly esteemed dessert and culinary fruit.

We do not know that any persistent efforts have been made in this direction, but every year confirms our original belief as to its value. The shrub almost invariably yields a full crop early in July in this latitude, and its mild acid flavor is agreeable to almost every one. Indeed, many persons prefer it to the currant.

Among the choicest grapes from eastern states now seen are Delawares, and Niagaras from North Carolina; Champion, Ives and Moore's Early also come in southern shipments. Apricots in five-pound baskets are coming from the interior of this state, and Chelsea plums, in eight-pound packages, from North Carolina. Le Conte, Keiffer, Bell and Catherine are among the pears received from neighboring states. Watermelons, from Virginia and the Carolinas, and muskmelons, from Maryland, Virginia and North Carolina, are plentiful.

The current number of *Science* contains an article by Professor Bradley M. Davis describing types of plant-life in the hot springs of Yellowstone Park, and explaining in an interesting way how this minute vegetation helps to build up the deposits of various crystals. Not only do these algæ aid in forming rocks, but the most beautiful sculpturing and coloring of the Mammoth Hot Springs, the peculiarities of the columns and moldings and the capitals, as well as the rich browns, olives, oranges and greens with which they are painted, are all directly due to the presence of these plants.

Lilium Henryi, which was discovered a few years ago by Dr. Henry in China, has been called the orange Speciosum, but really the Chinese Lily is a nobler plant, much more graceful, and only resembles L. speciosum in the form of its flower. Mr. A. Herrington has sent to this office a spike from Mr. Twombley's place in Madison, which is five feet high, although it is from a bulb planted last autumn. The stalk is covered with leaves throughout its entire length, and the poise of the flowers at the ends of their long slender stems gives the plant a most elegant and distinguished air.

The leading cut flowers on the street stands now are China asters and gladioli, since sweet peas have passed their prime and are rather short-stemmed. Coreopsis continues to furnish good flowers, as it has done all the summer through, being really one of the very best of plants for the production of yellow flowers. Tuberoses, once the most popular of street flowers, is again occasionally seen, and seems to be growing in popularity on the east side of the town. Of course, there are always carnations and mignonette, but at no other season do the stands of the sidewalk venders show so little variety as they now do.

Seventy-six carloads of California fruits received here last week included one car of selected Valencia oranges, an unusually late shipment of this fruit. Nectarines are among the scarcer fruits from the west. Bartlett, Souvenir du Congrès, Beurre Clairgeau, Duchess and Clapp's Favorites comprise the pears in season, and the first Flame Tokay, Chasselas de Fontainebleau or Sweetwater, White Muscat of Alexandria and Thompson Seedling grapes are now offered. Bartlett pears are especially good this year, and 21,300 boxes of this fruit were sold here last week, with 17,000 boxes of peaches and 19,700 crates of plums.

The food markets of the foreign colonies have a unique interest among the more uncommon phases of life in American cities. In our own city, on turning into the foot of Mulberry Street, off the Bowery, a complete change of scene is at once realized, especially on Saturday morning. Except from children on the streets or in the popular little Mulberry Bend park, no English word is heard, and besides now and then a Chinese laundryman bent on buying some bunch onions at a close bargain, Italians only are seen. Even the experienced New York produce dealer would here find new and strange vegetables, not to speak of bread and cheese and meat in surprising shapes and sizes and colors. At this season popular favor of the buyers seems to rest with greens for salads, onions, sweet peppers, tomatoes, the unfamiliar fruits of many cucurbitaceous plants and string-beans in the order named. There are strap-leaved lettuces, true chicory leaves tied in bunches, not the endive which is usually sold here under that name, enormous leaves of Swiss chards, bunches of celery tops and of strong plants of dandelion with coarse leaves more than a foot long, tender young plants of aromatic fennel with finely dissected leaves, fresh Bee Balm, creeping thyme, marjoram, hyssop and many other unidentified plants of the Mint family. Stems of our common Mallow, with their leaves and cheeses, are recommended by the venders for infantile stomach pains. Among odd forms of the cabbage family are stalks of cauliflower fifteen inches long, and sold for eight cents a bunch. The crinkled Savoy cabbage is much in evidence, and small heads of ordinary varieties of cabbage are measured by the quart and sold for five cents. Inferior quality is most apparent in stale eggplants, and especially in tomatoes, many of which are unfit for food. Tomatoes show the effect of the recent wet and sunless days perhaps more than any other vegetable, and the better grades now in our markets at fifteen cents a pound are of comparatively poor flavor and color, so that some idea can be had of the kind sold on Mulberry Street for two cents a pound, and these are not the poorest seen there. The economy practiced with potatoes, which are generally very small, is more reasonable, and three cents a quart is the prevailing price—less than half that asked for larger ones in better markets. On the other hand, large size counts with peppers, and immense ones sell at the rate of two for three cents. The stock is offered from push trays along the curbs and counters on the sidewalk along the house fronts, while there are occasional shops with medleys of garlic, dried leaves and herbs for flavoring, dried peas, lentils, and beans of many sizes and colors, some large brown ones being parched and encrusted with salt. Olives, black and green, and prunes and capers in oil are exposed in tubs, and an unhusked grain, some form of millet from Italy, is shown in barrel lots, at ten cents a quart. Watermelons, whole and in sections, are almost the only fruit offered here. Many of the staple vegetables come from the wholesale markets, while the salad greens and gourds are grown by the venders and by other Italian farmers in New Jersey.

Very interesting is a little bulletin of a dozen pages issued by the Agricultural Experiment Station at Berkeley, California, and giving an account of the researches of C. W. Woodworth in relation to the vine hopper. The vineyards of that state are injured in the first place by the mysterious Anaheim disease, which has so far baffled all investigation and destroys vineyard after vineyard, with nothing to arrest its progress. Then come phylloxera and the mildew, for both of which there are remedies which at least hold these ravages in check. Lastly is the vine hopper, which is not so serious in itself, but against which all remedies formerly used have proved unavailing. It seems that the life-history of this insect has hitherto not been understood. A great deal of time and money has been spent every year in attempts to destroy the eggs in winter, when, in fact, the insect does not pass the winter as an egg. Much trouble has been taken also to kill the insect in the soil, but it does not pass the winter in the ground. The vines have been sprayed in winter under the supposition that the bark is full of eggs, or that the insect is hiding beneath it, but the insect does not pass the winter on the vine. Neither does it pass the winter in fallen leaves, so that the money spent in destroying these leaves has been wasted. The fact is, that during the winter the perfect insects are feeding on all sorts of green plants, but they only take food enough to meet their present needs, so that their ravages are not noticed. It is in the spring when they begin to grow, and food is needed to produce their eggs, that the young Vine-leaves find them waiting. Spraying the leaves with poison is of no avail, for they suck the juices from the inside of the leaf with their probosces. They are small insects, it is true, and they take but little. But in the drier parts of the year they stop the growth of the leaves and kill them. There is no occasion here to give any further sketch of the history of the insect nor to quote the various remedies which have been used, together with the reasons why they have been ineffectual. Suffice it to say that in the spring-time jarring, as we treat Plum-trees in the east, is useful. A so-called hopper dozer is a contrivance similar to fly-paper, against which the insects are made to leap and stick fast, and this is also to a certain extent effective. Better still is a palm-leaf fan and a can of the sticking mixture large enough to dip it into. Skillful men working in pairs can do great execution. And finally a common conical bag-net attached to a handle is often found effective early in the morning all summer long. It is useless to try to exterminate this pest. The treatment recommended is based on the fact that a considerable number of hoppers do little injury to the crop. The problem is how to reduce their numbers below the danger-point. Whenever the Vine grower finds that these pests are appearing in dangerous numbers, if he sets his nets going at once he can probably destroy enough to save his crop at a cost of from fifteen to twenty cents an acre. If the Vine grower can develop a judgment which can be trusted as to when the insects are appearing in dangerous numbers, the net and the palm-leaf fan are the most promising means of defense against their ravages.